

Factors Affecting the Fisheries Biodiversity of Ratargul Swamp Forest of Sylhet District, Bangladesh

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Abstract: The study was conducted to identify the factors affecting fisheries biodiversity in Ratargul Swamp Forest under Goainghat Upazila in Sylhet district for a period of 12 months from July 2014 to May 2015. The study was done by questionnaire interviews (QI) of fishes, focus group discussions (FGD), key informant interview (KII) and secondary data collection. During the study period, a total of 94 fish species were recorded where 63 species were found. Among them 28 species are threatened, of which 14 are vulnerable, 10 are endangered and 4 are critically endangered. Highest abundance of commonly available 37 species was found in October to January and lowest species abundance was observed in April to June. It is revealed that there has been gradual reduction of fish diversity in the swamp forest areas that is from the earlier 94 species to present 63 species (32.98% declined). Major factors affecting fish biodiversity were grouped into three categories such as manmade factors, environmental factors and policy issues. Now a day's uncontrolled management of tourism is one of the main factors for reducing biodiversity. During the survey 91.25% respondents navigation is the main factor for affecting biodiversity followed by tourism and fishing. Among environmental factor, 84.1% respondents opened water depth reduction followed by reducing rainfall and high temperature. Community based fisheries management, fishing gear maintenance, afforestation, implementation of fishing acts and regulation, controlled tourism and public awareness can play great role in conserving fish biodiversity. It can be concluded that factors identified in the present study need to be addressed to conserve and enhance fish biodiversity in the Ratargul swamp forest of Bangladesh.

Key Words: Biodiversity, factors and Ratargul swamp forest.

I. Introduction:

Swamp forests around the world play a pivotal role in maintaining biodiversity, sustaining livelihood, and nourishing the ecosystem of wetlands. The Asia-Pacific region-particularly Australia, Indonesia, Malaysia, Vietnam, Papua New Guinea, and countries of Africa-are still endowed with swamp forests to a varying degree. These precious resources act as a harbor (spawning ground) of rich fresh water species of fish, and a repository of a number of non-timber forest products. Bangladesh too is blessed with both saltwater and freshwater swamp forests. This freshwater swamp water is Ratargul swamp forest.

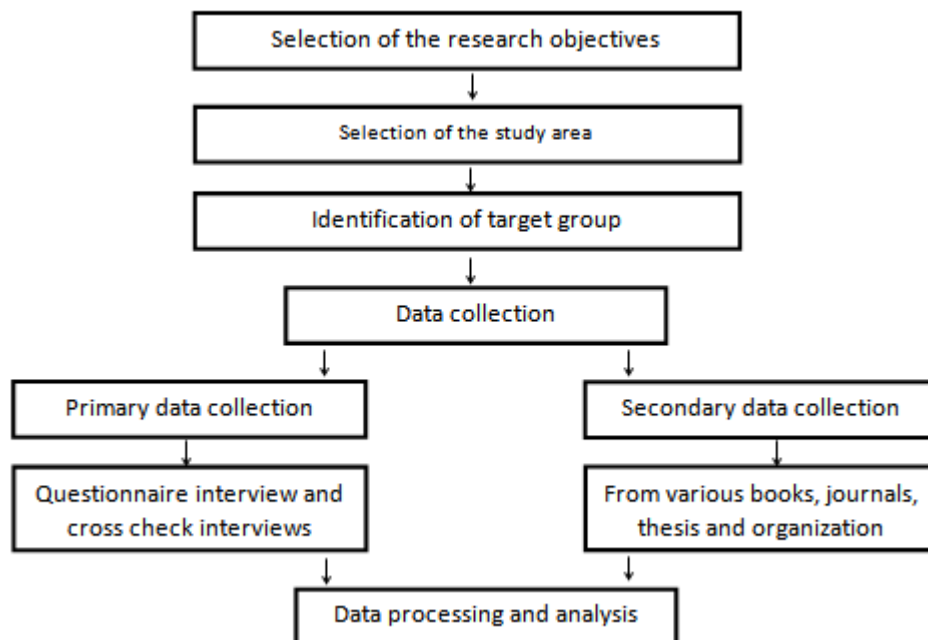
Bangladesh's freshwater swamp forests demand special attention and significance due to their unique characteristics in maintaining wetland biodiversity. It is the only swamp forest located in Bangladesh and one of the few freshwater swamp forest in the world (Gopal, 1999). Located some 45 kilometer away from the Sylhet city center, towards the north-west, the Ratargul Forest falls within the administrative jurisdiction of the Goainghat Upazila in Sylhet (Banglapedia, 2012). The management of the forest is under purview of the North Sylhet Range of the Sylhet Forest Division. Inundated and nourished by the freshwater streams of the Goain River (locally called ChengerKhal) and its tributaries (FRSS, 2013). The area of the forest is 118.4615 ha. Ratargul has created a unique wetland ecosystem. The administrative beat office is situated at latitude 25° 00.025'N and longitude 91°58.180'E (Choudhury *et al.*, 2004). Ratargul area was declared as Reserved Forest under the Assam Forest Act in 1932. An area of 292.60 acres was declared as Reserved Forest vides notification number 1774-R dated June 9th 1932. In the past these areas were allocated to "Pollarding Working Circle" under Sylhet Forest Division (Ali, 1991). Ratargul's ecosystem is enriched with wetland plants, mammals, avifauna, and reptiles. A recent study enumerated 74 plants species, 9 amphibians, 20 reptiles, 26 mammals, and 175 birds (including migratory ones) in the locality. The forest ecosystem is also supporting the habitat of numerous freshwater fish species.

II. Materials and Methods:

Duration of the Study: The field investigation was conducted for a period of 12 months from July 2014 to May 2015.

Design of Experiment:

The present study was completed according to the following order of methodology:



Site Selection: Selection of the study area is a very important step for conducting any research work. Ratargul Swamp Forest of Sylhet district were selected for the present study. The primary criterion for the selection of the area was a suitable geographical coverage for fisheries biodiversity. This is why the forest has been selected considering its importance.



Figure 1: Map of Ratargul Swamp Forest



Figure 2: Image of Ratargul Swamp Forest

Data Collection Method:

Primary Method:

1. Questionnaire survey:

To collect data first I had to select a target group in this location and communicate with them through Focused Group Discussion (FGD) to develop a questionnaire. After developing a questionnaire, it was implemented preliminarily to evaluate its efficiency. On the basis of its efficiency, this questionnaire finally was improved and implemented.

2. Direct survey:

Direct observation techniques allow for a more systematic, structured process, using well-designed observation record forms. Data was collected by physical observation and interview with fisherman.

Data cross checking:

To justify the accuracy of this primary data, I had to collect some secondary data from books, thesis paper, journal, Government organization and non-Government organization like as District Fisheries office, Sylhet Agricultural University, Sylhet.

Data analysis:

Finally I analyzed these collected data about factors affecting fisheries biodiversity and find out the necessary steps for improvement of habitat by using Microsoft office excels and other modern scientific techniques as appropriate. The collected data were then edited; summarized and graphical representations were made.

III. Results and Discussion:

Biodiversity Status of Threatened Fish Species Found from the Study Area:

A total of 94 fish species were recorded in the Ratargul swamp forest. Among them 28 species are threatened, of which 14 are vulnerable, 10 are endangered and 4 are critically endangered.

Table 1: A list of threatened fish species as recorded during the present study

SL. No.	Family	Local Name	Common Name	Scientific name	Remarks
01	Cyprinidae	Goniya	KuriaLabeo	<i>Labeogonius</i>	VU
02	Cyprinidae	Kalibaush	Black Rohu	<i>Labeocalbasu</i>	VU
03	Cyprinidae	Bata	Minor carp	<i>Labeobata</i>	VU
04	Cyprinidae	Nanid	Nandi Labeo	<i>Labeonandina</i>	VU
05	Cyprinidae	Mohashol	Tor Mohseer	<i>Tor tor</i>	EN
06	Bagridae	Rita	Rita	<i>Rita rita</i>	EN
07	Schilbeidae	Gharua	GharuaBacha	<i>Clupisomagarua</i>	CE
08	Schilbeidae	Bacha	BatchwaBacha	<i>Eutropiichthysvacha</i>	CE
09	Siluridae	ModhuPabda	Butter Catfish	<i>Ompokpabda</i>	EN
10	Siluridae	KaniPabda	Indian Butter Catfish	<i>Ompokbimaculatus</i>	EN
11	Siluridae	Pabda	Pabo Catfish	<i>Ompokpabo</i>	EN
12	Plotosidae	Gang Magur	Canine Catfish	<i>Plotosuscanius</i>	VU
13	Cyprinidae	Tit Punti	Ticto Barb	<i>Puntiusticto</i>	VU
14	Clupeidae	Ilish	Indian River Shade	<i>Tenualosailisha</i>	VU
15	Channidae	PiplaShol	Barca	<i>Channabarca</i>	CE
16	Mastacembelidae	Tara Baim	One Striped Spiny Eel	<i>Macrognathusaculeatus</i>	VU
17	Mastacembelidae	BaroBaim	Two-track Spiny Eel	<i>Mastacembelusarmatus</i>	EN
18	Sybranchidae	Cuchia	Gangetic Mud Eel	<i>Monopterusuchia</i>	VU
19	Ambassidae	LalChanda	Indian Glass Perchlet	<i>Parambasislala</i>	EN
20	Ambassidae	GolChanda	Indian Glass Fish	<i>Parambassisranga</i>	VU
21	Ambassidae	LambaChanda	Elongated Glass Perchlet	<i>Chandanama</i>	VU
22	Pristolepidae	Napit Koi	Blue Perch	<i>Badisbadis</i>	EN
23	Nandidae	Meni	Mud Perch	<i>Nandusnandus</i>	VU
24	Anguillidae	Bamosh	Indian Longfin Eel	<i>Anguilla bengalensis</i>	VU
25	Notopteriidae	Chital	Humped Featherback	<i>Notopteruschitala</i>	EN
26	Notopteriidae	Foli	Bronze Featherback	<i>Notopterusnotopterus</i>	VU
27	Cobitidae	Bou Rani	Bengal Loach	<i>Botiadario</i>	CE
28	Tetraodontidae	Potka	OcellatedPufferfish	<i>Tetraodoncutcutia</i>	EN

*(VU- vulnerable, EN- endangered, CE-critically endangered)

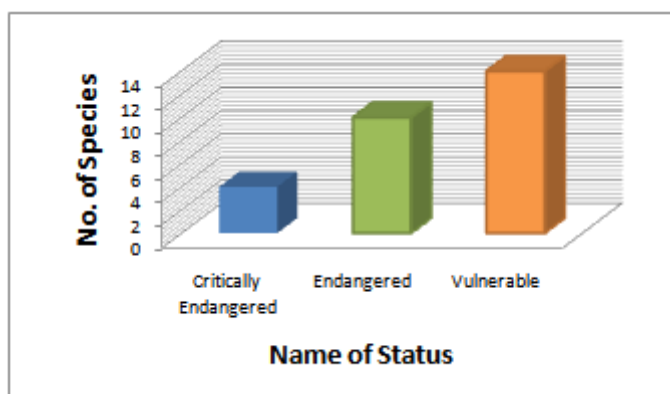


Figure3: Present status of threatened fish species in the study area

Biodiversity has enormous economic and aesthetic value and is largely responsible for maintaining the ecosystem. People depend on aquatic resources for food, medicine and materials as well as for recreational and commercial purposes such as fishing and tourism. Aquatic organisms also rely upon the great diversity of aquatic habitats and resources for food, materials and breeding ground. Biodiversity of Ratargul is decreasing day by day due to some man made, environmental and social factors are showing below.

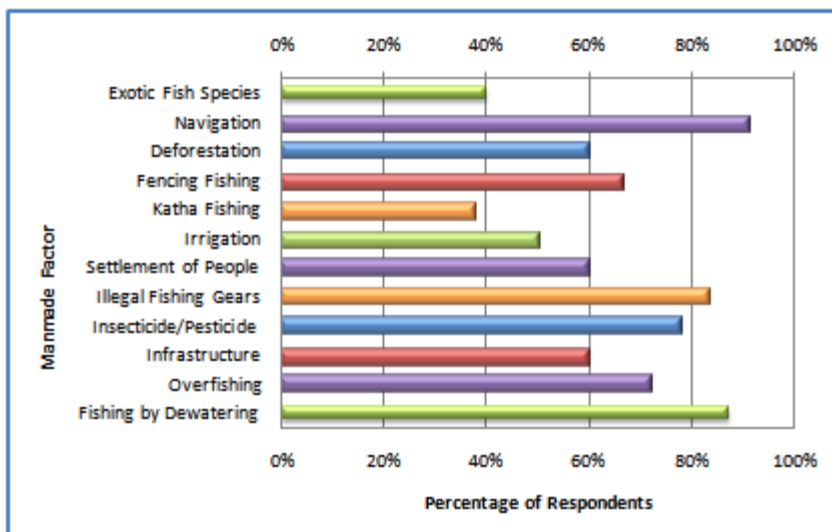


Figure4: Manmade factors responsible for fish biodiversity loss in the study area.

Environmental or Limnological Factors:

During this study period, majority of the fisherman (91% respondents) opined that water depth is the main environmental factor affecting fish abundance and diversity in the Ratargul swamp forest whereas temperature followed it according to perceptions of 71% of responding during the survey.

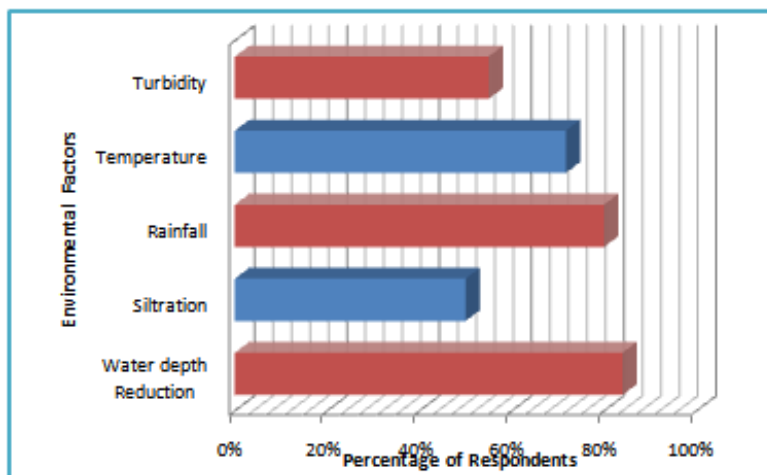


Figure5: Environmental factors for fish biodiversity loss.

The floodwater starts to enter the area by about May and remain flooded till about early October. But the inundation level changes with the intensity of rain. The water regime thus fluctuates but the sites remain highly wet all through the monsoon months (from May to October). During the month of March and first fortnight of April it experiences the driest condition and at some of the locations topsoil cracks during this dry spells.

May and October month are the hottest months having an average maximum temperature about 32°C, while January is the coldest when the minimum temperature drops to about 12°C.

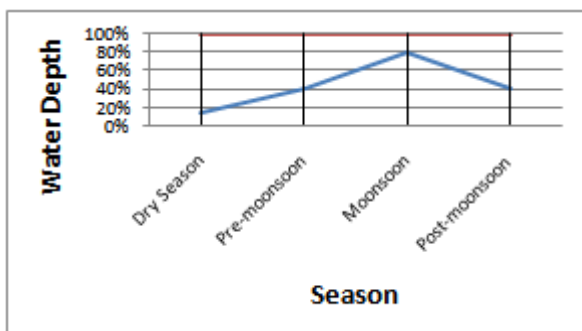


Figure6: Seasonal Variation of average water depth

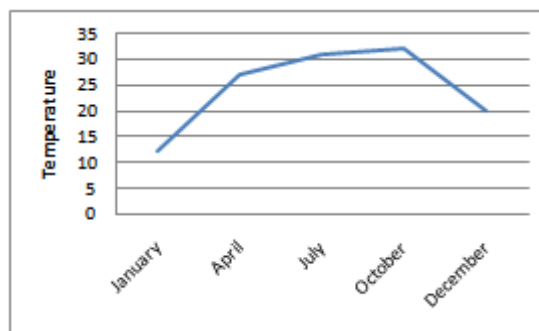


Figure7: Temperature fluctuation

Now a day's excess uncontrolled tourism is posing a serious threat to the biodiversity and the environment in the freshwater swamp forest. According to the Ratargul villagers, tourists from different parts of the country and abroad visit the forest round the year to enjoy its beauty but uncontrolled excess tourism affects the fisheries biodiversity. Wastage pollution, hamper of fish breeding and natural habitat decreasing occurs due to uncontrolled tourism.

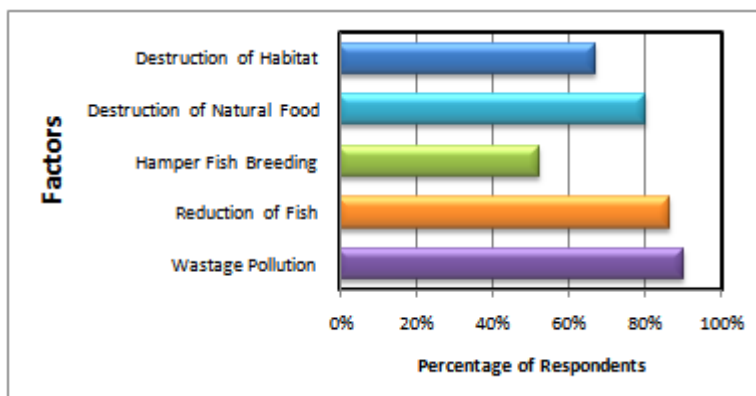


Figure8: Factors affecting due to uncontrolled tourism.

Management strategies for conservation of Fish Biodiversity:

Understanding the importance of fish biodiversity and its direct linkage with some factors, conservation of the same has been a very significant activity for sustainable use of fisheries resources. With the consultation with fishes and resource person, some measures have been found that are discussed below:

According to survey, fishers mention that CBFM (Community Based Fisheries Management) can play a great role in the following sector:

- Improvement of fish biodiversity
- Maintenance of fishing gear
- Fish production improvement
- Management of pollution and siltation
- Management of water quality.

For proper management of fish biodiversity, illegal fishing gears should be stopped. This will helpfully ensure that sufficient mother fish remain in water bodies to spawn and propagate in the next breeding season and thus sustain fish population (Afrose, 2013).

Fishers suggest that establishment of sanctuary is one of the effective tools for conserving fish stock, preserving biodiversity and increasing fish production. Community based sanctuary management is an effective tool to enhance fish biodiversity (Ali, MY. 1997).

The regulations used to cease the uncontrolled fishing pressure that hampers the fisheries resources by any kind of measure (Cairns and Lackey, 1992). According to fishers from survey, it can be applied in three ways which enforce the fishing laws; protection, preservation and habitat improvement.

Majumder *et al.* (2013) suggest that more intensive awareness raising campaign should be administered amongst the community people about the importance of natural resources that have direct affected on their

livelihood. In this way, a comprehensive and sustainable management strategy should be developed by involving all the stakeholders to protect the natural resources from further degradation.

IV. Conclusion:

Ratargul forest is naturally a fisheries resourceful zone of Bangladesh because of its rich aquatic biodiversity. The forest ecosystem plays a vital role in sustaining the biodiversity of fish fauna and contributes to the development of the economy of the country (Allan, 1993). There are several factors that are affecting the forest biodiversity. According to the statement of the respondent fisherman, complete fishing by dewatering and overfishing were mainly responsible for loss of fish biodiversity. Constructions of watch tower were responsible for reducing fish biodiversity through squeezing total living areas of fishes. Washed out residues of insecticides, pesticides and herbicides from agricultural land have direct and indirect effects on fish biodiversity. It can be concluded the factors identified in present study need to be addressed to conserve and enhance fish biodiversity in the Ratargul swamp forest of Bangladesh.

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